CLAIMS

What is claimed is:

1. A method of detecting the modification of a substrate, comprising the steps of:

a) exposing an unmodified substrate to a sample under conditions that will result in a modification of the substrate, the unmodified substrate including a peptide and a first colorimetric component, the first colorimetric component coupled to the peptide; and

b) detecting a modification of the substrate or an absence of the modification of the substrate, wherein the modification comprises cleaving the first colorimetric component from the substrate and results in a visible color change.

2. A method according to Claim 1, wherein the first colorimetric component is covalently bonded to the peptide.

3. A method according to either Claim 1 or 2, wherein the modification includes hydrolysis of a peptide bond and results in a portion of the peptide detaching from the substrate.

4. A method according to any of Claims 1-3, wherein the substrate includes at least one member of the group consisting of the peptide sequence LLGDFFRKSKEKIGKEFKRIVXRIKDFLRNLVPRTES, the peptide sequence KAAHKSALKSAE, the peptide sequence KKASEAAHKSALKSAE, the peptide sequence CHHHASEAAHKSALKSAE, the peptide sequence KHLGGGALGGGAKE, the peptide sequence KHLGGGGGAKE, the peptide sequence ACCDEYLQTKE, the peptide sequence ADTVEPTGAKE, the peptide sequence KLPHKLSWSADNP, the peptide sequence PVPSTPPTPSPSTP, the peptide sequence NMLSEVERE, the peptide sequence KQNMLSEVERADTE, the peptide sequence

NEAIQEDQVQYE, the peptide sequence ETKVEENEAIQK, the peptide sequence DSRPVRRRRRPRVSK, the peptide sequence KVSRRRRRGGD, the peptide sequence KKASEVSRRRRRGGK, the peptide sequence CHHHASEVSRRRRRGGK, the peptide sequence KEKIGKEFKRIVQE, the peptide sequence KVQRIKDFLRNLVE, the peptide sequence EAAGAMFLEAIPK, the peptide sequence EGAMFLEAIPMSIPK, the peptide sequence CGAMFLEAIPMSIPAAAHHHHH, the peptide sequence KARRRRRGGGAMFLEAIPMSIPCGC, the peptide sequence VSRRRRRGGDGDGC, the peptide sequence GGDGDGC, the peptide sequence VSRRRRRGGDGKGDAC, the peptide sequence NEAIQEDQVQARRAKARRAC, the peptide sequence QVQARRAKARRAC, the peptide sequence GGDGKGDAC, the peptide sequence QVQARRRAKARRRAC, the peptide sequence VSRRRRRGGKGC, the peptide sequence SVTRRRRRGGRASGGC, the peptide sequence SEAIQEDQVQYCAAAHHHHH, the peptide sequence KARRRRRGGDGDGCGC, the peptide sequence HHHHHSRRRRRGGCGC, the peptide sequence HHHHHSVQRIKDFLRNLVCGC, the peptide sequence RRRRRSVQRIKDFLRNLVCGC, the peptide sequence HHHHHAAHKSALKSACGC, the peptide sequence RRRRRAAHKSALKSACGC, the peptide sequence PGTKLYTVPW, an Alt derived peptide, a peptidoglycans, lipoteichoic acid, and a lipid vesicle.

5. A method according to any of Claims 1-4, wherien the first colorimetric component is one of the members of the group consisting of a dye; a reactive dye; a fiber reactive dye; a dye suitable for use in a contact lens; a dye suitable for use in a suture; a monohalogentriazine dye; a dihalogentriazine dye; a 2,4,5 trihalogenopyriminidine dye; a 2,3 dihaloquinoxaline dye; a N-hydroxysulfosuccinimidyl a (sulfo-NHS) ester functionalized dye; a N-hydroxysuccinimidyl (NHS) functionalized dye; a vinyl sulfone dye; a sulfonyl chloride dye; a tetrafluorophenyl ester functionalized dye; an isothiocyanate functionalized dye; and an iodoacetyl functionalized dyes.

6. A method according to any of Claims 1-5, wherein the visible color change is a loss of color.

7. A method according to any of Claims 1-6, wherein the unmodified substrate further includes a second colorimetric component that is dissimilar to the first colorimetric component.

8. A method according to any of Claims 1-7, wherein the peptide is coupled to a solid support.

9. A method according to Claim 8, wherein the modification of the substrate results in a hue of the solid support becoming more visible.

10. A method according to either Claim 8 or 9, wherein the peptide is covalently attached to the solid support.

11. A method according to any of Claims 8-10, wherein the solid support is selected from the group consisting of a wound dressing, a sterilized material, an article that contains the sample, an article that collects the sample, a polymer, a membrane, a resin, glass, a sponge, a disk, a scope, a filter, a lens, a foam, a cloth, a paper, a suture, and a bag.

12. A method according to any of Claims 1-11, wherein the sample is at least one of the group consisting of a wound surface on a subject, a body fluid, a piece of hair, a piece of nail, a piece of shell, a piece of scale, a piece of feather, a piece of tissue, an article implanted in the body of an animal, catheter, a urine collection bag, a blood collection bag, a plasma collection bag, a disk, a scope, a filter, a lens, foam, cloth, paper, a suture, a swab, a dipstick, a sponge, a polymeric article, an article made of a resin, a glass article, a test tube, a well of a microplate, a portion of contact lens solution, a

sponge, a polymeric material, a membrane, an article made of resin, an article made of glass, and a swab.

13. A method according to any of Claims 1-12, wherein modification of the substrate includes cleaving a portion of the peptide to produce a cleaved portion, the cleaved portion including the first colorimetric component, the modification resulting in the migration of the cleaved portion toward a collector, and the migration resulting in a visible color change.

14. A method according to Claim 13, wherein the collector includes at least one material selected from the group consisting of a membrane, a resin, a polymer, a film, glass, or a chelating material.

15. A method according to any of Claims 1-14, wherien modification of the substrate is used to indicate the presence of a bacterial enzyme selected from the group consisting of a lysin, an autolysin, a lipase, an exotoxin, a cell wall enzyme, a matrix binding enzyme, a protease, a hydrolase, a virulence factor enzyme, and a metabolic enzyme.

16. A biosensor for detecting the presence or absence of a protein, the biosensor comprising a peptide that specifically reacts with a protein and a first colorimetric component coupled to the peptide.

17. A biosensor according to Claim 16, wherein the first colorimetric component is covalently bonded to the peptide.

18. A biosensor according to either Claim 16 or 17, wherein the substrate includes at least one member of the group consisting of the peptide sequence LLGDFFRKSKEKIGKEFKRIVXRIKDFLRNLVPRTES, the peptide sequence KAAHKSALKSAE, the peptide sequence KKASEAAHKSALKSAE, the peptide sequence CHHHASEAAHKSALKSAE, the peptide sequence

KHLGGGALGGGAKE, the peptide sequence KHLGGGGGAKE, the peptide sequence ACCDEYLQTKE, the peptide sequence ADTVEPTGAKE, the peptide sequence KLPHKLSWSADNP, the peptide sequence PVPSTPPTPSPSTP, the peptide sequence NMLSEVERE, the peptide sequence KQNMLSEVERADTE, the peptide sequence NEAIQEDQVQYE, the peptide sequence ETKVEENEAIQK, the peptide sequence DSRPVRRRRRPRVSK, the peptide sequence KVSRRRRRGGD, the peptide sequence KKASEVSRRRRRGGK, the peptide sequence CHHHASEVSRRRRRGGK, the peptide sequence KEKIGKEFKRIVQE, the peptide sequence KVQRIKDFLRNLVE, the peptide sequence EAAGAMFLEAIPK, the peptide sequence EGAMFLEAIPMSIPK, the peptide sequence CGAMFLEAIPMSIPAAAHHHHH, the peptide sequence KARRRRRGGGAMFLEAIPMSIPCGC, the peptide sequence VSRRRRRGGDGDGC, the peptide sequence GGDGDGC, the peptide sequence VSRRRRRGGDGKGDAC, the peptide sequence NEAIQEDQVQARRAKARRAC, the peptide sequence QVQARRAKARRAC, the peptide sequence GGDGKGDAC, the peptide sequence QVQARRRAKARRRAC, the peptide sequence VSRRRRRGGKGC, the peptide sequence SVTRRRRRGGRASGGC, the peptide sequence SEAIQEDQVQYCAAAHHHHH, the peptide sequence KARRRRRGGDGDGCGC, the peptide sequence HHHHHSRRRRRGGCGC, the peptide sequence HHHHHSVQRIKDFLRNLVCGC, the peptide sequence RRRRRSVQRIKDFLRNLVCGC, the peptide sequence HHHHHAAHKSALKSACGC, the peptide sequence RRRRRAAHKSALKSACGC, the peptide sequence PGTKLYTVPW, an Alt derived peptide, a peptidoglycans, lipoteichoic acid, and a lipid vesicle.

19. A biosensor according to any of Claims 16-18, wherien the first colorimetric component is one of the members of the group consisting of a dye; a reactive dye; a fiber reactive dye; a dye suitable for use in a contact lens; a dye suitable for use in a suture; a monohalogentriazine dye; a dihalogentriazine

dye; a 2,4,5 trihalogenopyriminidine dye; a 2,3 dihaloquinoxaline dye; a N-hydroxysulfosuccinimidyl a (sulfo-NHS) ester functionalized dye; a N-hydroxysuccinimidyl (NHS) functionalized dye; a vinyl sulfone dye; a sulfonyl chloride dye; a tetrafluorophenyl ester functionalized dye; an isothiocyanate functionalized dye; and an iodoacetyl functionalized dyes.

20. A biosensor according to any of Claims 16-19, further including a second colorimetric component coupled to the peptide, the first colorimetric component being dissimilar to the first colorimetric component.

21. A biosensor according to any of Claims 16-20, further including a solid support, the peptide coupled to the solid support.

22. A biosensor according to Claim 21, wherein the peptide is covalently attached to the solid support.

23. A biosensor according to either Claim 21 or 22, wherein the solid support is selected from the group consisting of a wound dressing, a sterilized material, an article that contains a sample, an article that collects a sample, a polymer, a membrane, a resin, glass, a sponge, a disk, a scope, a filter, a lens, a foam, a cloth, a paper, a suture, and a bag.

24. A biosensor according to any of Claims 16-23, further including a collector that includes at least one material selected from the group consisting of a membrane, a resin, a polymer, a film, glass, or a chelating material.

25. A biosensor according to any of Claims 16-24, wherein the peptide includes a sequence that specifically reacts with an enzyme selected from the group consisting of a lysin, an autolysin, a lipase, an exotoxin, a cell wall enzyme, a matrix binding enzyme, a protease, a hydrolase, a virulence factor enzyme, and a metabolic enzyme.

26. A kit for detecting a protein, comprising a biosensor according to any of Claims 16-25 and at least one reagent.